IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Applicant	:Rejean AUBE
Serial No.	:09/895,334
Filed	:July 2, 2001
Title	:DELAY COMPOSITIONS AND DETONATION DELAY DEVICES UTILIZING SAME

KIRBY EADES GALE BAKER,
Box 3432, Stn. D,
Ottawa, Ontario.
Canada K1P 6N9

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
United States of America

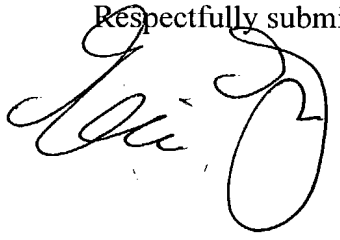
Dear Sir:

SUBMISSION OF BRIEF ON APPEAL

Hereby submitted in triplicate is a Brief on Appeal together with the fee therefore of $330.00.

Also submitted concurrently herewith is a Petition for a one month extension of time and a fee of $110.00.

Respectfully submitted,



Edwin Gale
Reg No. 28,584
Tel (613) 237-6900
Our File No. 45888-1
June 16, 2004

Attorney Docket No. 45888-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants: Rejean AUBE

Serial No. : 09/895,334 Group Art Unit 3641

Filed : July 2, 2001 Examiner A. Felton

For : DELAY COMPOSITIONS AND DETONATION DELAY DEVICES UTILIZING SAME

BRIEF ON APPEAL

This is appellant's Brief under 37 C.F.R. §1.192 in support of appellant's appeal to the Board of Patent Appeals and Interferences under 37 C.F.R. §1.191 from the final rejection of claims 1 - 11 of the above-identified application.

(1) Real Party in Interest

The real party in interest is Orica Explosives Technology Pty Ltd., a corporation of Australia having a place of business at Melbourne, Australia.

(2) Related Appeals and Interferences

There are no other appeals or interferences known to appellant or appellant's legal representative or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

Claims 1 - 11 are in the application. All of these claims have been finally rejected under 35 U.S.C. §103(a), in a final Office Action dated September 18, 2003.

Claims 1 - 29 were presented in the above-identified regular U.S. patent application, which claims the priority benefit, under 35 U.S.C. §119, of Canadian patent application No. 2,340,523, filed July 2, 2001. Claims 12 - 29 were withdrawn from consideration following a requirement for restriction, and were canceled without prejudice in an Amendment filed August 22, 2003 (with a Request for Continued Examination) in response to a final Office Action dated March 24, 2003. Claims 1 - 11 have not been amended. The claims appealed are all the finally rejected claims, viz., claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11.

(4) Status of Amendments

The aforementioned Amendment filed August 22, 2003, was entered. No amendment was filed subsequent to the final rejection (dated September 18, 2003) from which the present appeal is taken. Appellant filed a response to the final rejection without amending any claim. In an Advisory Action dated February 13, 2004, the Examiner maintained the rejection of claims 1 - 11, stating that "applicant's arguments are not persuasive and require further consideration."

(5) Summary of Invention

In the following summary, page and line numbers refer to appellant's specification, and Figure numbers and reference characters refer to the drawings of the above-identified application.

The claimed invention is directed to delay compositions for use in delay detonators or other detonation delay devices employed in blasting operations, e.g., mining or quarrying, to create a delay between a firing signal (onset of ignition) and the instant at which an explosive charge is set off, and thereby to provide desired control of the timing sequence of detonation of charges (p. 1, lines 4-24). Merely by way of specific illustration of examples of use of the claimed delay compositions, Figs. 1

and 2 show delay detonators each having a delay element 14a or 14a' constituted of a tubular metal confinement element 14 or 14' containing a compressed column of the delay composition 16 or 16' between a starter charge 18 or 18' and an initiating or primer charge 15 or 15' immediately adjacent a base charge 12 or 12' of explosive (p. 7, line 6 - p. 8, line 8). When ignition of the starter charge ignites one end of the column of delay composition, the column burns along its length until it sets off the primer charge which in turn detonates the base charge (p. 1, line 25 - p. 2, line 13). The burn rate of the delay composition and the length of the column of delay composition determine the duration of the delay (between firing signal and base charge detonation) provided by the delay element.

More particularly, the invention defined by claim 1 on appeal is a delay composition *per se*, comprising mixed particles of silicon, barium sulfate and red lead, the red lead being present in an amount of about 3 to 15% by weight of the composition (p. 5, lines 24-27). Preferably, the red lead is present in an amount of about 6 to 12% (claim 2; p. 5, line 26), and more preferably in an amount of about 9 to 12% (claim 3; p. 5, lines 26-27), by weight of the composition.

The composition may contain about 40 to 60% by weight of barium sulfate and about 25 to 50% by weight of silicon (claim 4; p. 5, lines 28-30). In addition, the composition preferably also contains a binder causing collections of the particles to bind together in the form of free-flowing granules (claim 5; p. 6, lines 1-2). Suitable binders include solvent-soluble polymers, silica and swelling clays (claim 6; p. 6, lines 3-4), preferably a water-soluble derivative of cellulose (claim 7; p. 6, lines 4-5), e.g. carboxymethyl cellulose (claim 8; p. 6, line 5). Also preferably, the binder is present in an amount of 0.2 to 0.6% by weight of the composition (claim 9; p. 6, lines 2-3).

Preferably, as well, the particles of barium sulfate have a specific surface area of about 0.8 m^2/g, the particles of silicon have a specific surface area of 6 to 8 m^2/g, and the red lead has a particle size of about 1 to 3 microns (claim 10; p. 9, lines 14-18). The delay composition may be in the form of free flowing granules each consisting essentially of mixed particles of silicon, barium sulfate and red lead, together with a binder, the red lead being present in an amount of about 3 to 15% by weight of the composition (claim 11; p. 8, lines 21-22; p. 9, lines 9-10 and 28-30).

While all the claims on appeal, as stated, are directed to delay compositions *per se*, these compositions afford particularly important advantages when used in delay elements having rigid metal confinement elements, as distinguished from lead confinement elements. The term "rigid

metal," in appellant's specification, refers to metals (such as zinc, aluminum, steel and brass) that, when used to form confinement elements, are not easily drawn to a desired diameter or shaped using equipment conventionally used for lead, which is a soft metal. Heretofore, lead has commonly been employed to form confinement elements, but for environmental and other reasons it is currently preferred to use rigid metal in at least many instances. Owing, however, to the fact that these rigid metals have higher thermal conductivities and heat capacities than lead, they extract more heat from the column of delay composition as it burns, which can increase the failure rate of detonators and delay devices because there may be insufficient heat remaining in the delay composition until complete consumption of the composition has taken place, especially in low temperature environments of use and in delay units intended to provide long delays (p.2, line 18 - p. 3, line 12).

In the compositions of the claimed invention, the properties achieved by the presence of about 3 to 15 wt.% of red lead afford special advantages for use with a rigid metal confinement element. Pertinent test results are set forth in Table 1 (p. 12, lines 1-11) and in Figs. 9 and 10. Table 1 shows that at contents from 3% up to 9%, red lead increases the average time of delay compared to a composition having 0% red lead (hence, red lead is not acting just as an accelerant to the combustion process as might be expected); at the same time, a considerable improvement in reliability (Coefficient of Variation) is achieved compared to the composition having no red lead. Figs. 9 and 10 show that, over the range of 3 - 15% for red lead, the delay timings and the Coefficient of Variation (CV) remain quite stable (reach a plateau), which are essential considerations for the present invention. If these values varied significantly within the range, it would make the compositions very sensitive to content variations, and it would be necessary to measure the proportions of the ingredients very precisely, possibly more precisely than is compatible with mass-production. Figs. 9 and 10 also show that the delay timing and CV are optimal for the invention.

More generally, Example 1 (p. 11, line 13 - p. 12, line 25) demonstrates that the addition of a small amount of red lead to a barium sulfate/silicon mixture results in a composition exhibiting "improved performance in rigid [metal confinement] elements." That is to say, the presence of red lead in the claimed amount (3-15%), while not substantially altering the burning rate of a barium sulfate/silicon mixture, imparts resistance to quenching caused by the heat-sink effect of a rigid metal confinement element (p. 10, lines 23-28).

(6) Issues

The sole issue presented for review on this appeal is whether claims 1 - 11 are unpatentable under 35 U.S.C. §103(a) over U.S. patent No. 5,031,538 (Dufrane et al.) in view of U.S. patent No. 3,291,664 (Taylor et al.).

(7) Grouping of Claims

The claims do not stand or fall together. Claims 5 – 9 and 11 are patentable separately from claims 1 – 4 and 10.

(8) Argument

A. The Errors in the Rejection

It is submitted that the rejection of claims 1 - 11 over Dufrane et al. in view of Taylor et al. is in error in that a content of about 3 to 15% by weight of red lead (to which all the claims on appeal are expressly limited) in a delay composition comprising mixed particles of silicon, barium sulfate and red lead would not have been obvious from the applied references, taken together, and however combined, at the time the invention was made.

It is submitted that the rejection is in error in that the "about 3 to 15 wt.%" range of red lead does not constitute obvious optimization of a result effective variable, as the final Office Action asserts.

It is submitted that the rejection is in error in failing to acknowledge or give patentable weight to appellant's showing of unexpected results attributable to the "about 3 to 15 wt.%" range of red lead content in the compositions defined by the claims on appeal.

It is further submitted that the assertion, in the final Office Action, that the "about 3 to 15 wt.%" range of red lead content does not distinguish the claimed invention from "the invention of

Dufrane" et al. because "No amounts [of red lead] are shown in Dufrane [et al.] so there is no way to determine that this invention differs from that which is claimed" is error as a matter of law.

Additionally, it is submitted that the rejection is in error in asserting that it would have been obvious to use a binder (to which claims 5 – 9 and 11 are limited) with a delay composition of barium sulfate, silicon and red lead.

B. Claim Limitations Not Described in the Prior Art

Neither reference describes, and no combination of them would have made obvious, a content of about 3 to 15% by weight of red lead (to which all the claims on appeal are expressly limited) in a delay composition comprising mixed particles of silicon, barium sulfate and red lead, as recited in each of the independent claims (1 and 11). Neither reference describes, and no proper combination of them would have made obvious, the use of a binder with such a delay composition, as recited in each of claims 5 (on which 6 – 9 depend) and 11.

C. How Such Limitations Render the Claimed Subject Matter Unobvious over Dufrane et al. in View of Taylor et al.

The broadest of the rejected claims are directed to a delay composition comprising mixed particles of silicon, barium sulfate and red lead, wherein the red lead is about 3 to 15 wt.% of the composition, although the claims are being examined with respect to an elected species also including a binder (carboxymethyl cellulose) which is within the scope of all the appealed claims. All the claims have been finally rejected under 35 U.S.C. §103(a) as unpatentable over Dufrane et al. in view of Taylor et al. The Examiner asserts that Dufrane et al. discloses a delay element that comprises barium sulfate, silicon and red lead; that Taylor et al. discloses the use of carboxymethyl cellulose with a delay composition; and that it would have been obvious to use the binder of Taylor et al. with the delay composition of Dufrane et al.

The problem with this rejection is that, even assuming *arguendo* that the asserted combination of references (i.e., use of the Taylor et al. binder in the Dufrane et al. composition)

would have been obvious, that combination would not meet or make obvious the claimed invention. In particular, it would not meet or make obvious the critical feature (to which all the claims are expressly limited) that the red lead content of the composition is about 3 to 15% by weight.

The Examiner, in the final rejection, contends that "Applicant's argument regarding the amount of red lead are not persuasive. Applicant has not shown that the claimed invention differs from the invention of Dufrane. No amounts are shown in Dufrane so there is no way to determine that this invention differs from that which is claimed."

This contention is clearly erroneous. Dufrane et al. does not teach anything about relative proportions of red lead in a mixture of silicon, barium sulfate and red lead. No range or limit of red lead content is mentioned in the patent, nor is any quantitative example of composition given. It is settled that a reference does not anticipate a claim to a composition having a specified range of proportions of an ingredient unless the reference discloses the range or some value within the range. See *In re Peterson*, 65 U.S.P.Q.2d 1379 (Fed. Cir. 2003). The fact that the reference disclosure generically embraces the claimed range does not constitute anticipation. Thus, under the law, the claimed invention differs from Dufrane et al. in having a red lead content of about 3 to 15 wt.%.

The statement that "there is no way to determine that [Dufrane et al.] . . . differs from that which is claimed" would be to the point only if there were a basis for contending that appellant's invention is or might be inherent in the Dufrane at al. disclosure. But such is not the case. Inherent disclosure of a feature means that the feature, though not explicitly set forth, is necessarily inherent in what is disclosed, so that a person following that teaching would unavoidably produce that feature. Appellant's specific red lead content is not necessarily inherent in the Dufrane et al. disclosure that merely names the composition ingredients, because there are many mixtures of such ingredients (e.g., those described by Davitt et al., U.S. patent No. 4,419,154, of record; see appellant's specification at p. 3, line 26) wherein the red lead content is outside appellant's claimed range. It would be mere happenstance whether one following the teaching of Dufrane et al. produced a composition containing about 3 to 15 wt.% of red lead.

In other words, the Examiner's above-quoted assertion seems to mean, on its face, that Dufrane et al. would anticipate the present invention but for the inclusion of a binder in appellant's elected species. Plainly, this is not so, since there is no express or even inherent anticipatory

teaching in Dufrane et al. of any composition containing about 3 to 15 wt.% of red lead. The latter range of proportions is novel, with respect to Dufrane et al. It is also well settled that a novel range of proportions of one or more ingredients may constitute a patentable distinction over prior art showing the ingredients but not the proportions.

Indeed, given that Dufrane et al. does not mention any range or value of the proportion of red lead that might be present in a delay composition mixture of barium sulfate, silicon and red lead, it is submitted that the range of red lead (any value greater than 0 and less than 100%) disclosed in the patent is so broad as to fail to render prima facie obvious appellant's claimed narrow range of about 3 to 15 wt.%. *Cf. In re Peterson, supra*, 65 U.S.P.Q.2d at 1382 n. 1.

Further, the Examiner asserts that "It would also be obvious to vary the amounts of the ingredients to optimize the performance of the delay composition. It is well-settled that optimizing a result effective variable is well within the expected ability of a person of ordinary skill in the subject art." To this there are several points of response. The first is that Dufrane at al. does not disclose or intimate that the proportion of red lead is a result effective variable at all. A "routine optimization" obviousness rejection must be grounded in a showing that the "result effectiveness" of the variable being optimized is recognized in the art (*In re Antonie*, 195 U.S.P.Q. 6, 9 (C.C.P.A. 1977)). The mere naming of the ingredients of a mixture (which is all that Dufrane et al. provides) does not inherently or necessarily imply that the proportionate content of each (or any) ingredient is a result-effective variable.

The second point is that Dufrane at al. does not merely propose a mixture of silicon, red lead oxide and barium sulfate as a delay composition, but states that "The delay composition may be of any known in the art, for example, a mixture of . . . silicon, red lead oxide . . . and barium sulfate." This, then, is a teaching of those mixtures of silicon, red lead oxide and barium sulfate that were already known in the art for use as delay compositions — not of any and all mixtures whether or not previously known for such use.

It is therefore pertinent to consider (as a person of ordinary skill in the art would be assumed to do) the content of the prior art thus referred to by Dufrane at al. The Dufrane at al. patent itself is unhelpful in this regard; none of the references it cites mentions any mixture of silicon, red lead and barium sulfate. The only prior art disclosures of such mixtures known to appellant are those

contained in Davitt at al. (cited supra), in the British counterpart of Davitt et al. (GB 2 089 336, also of record), and in Beck at al. U.S. patent No. 5,147,476 (later than Dufrane et al., but also of record and cited in appellant's specification) which incorporates the British counterpart of Davitt et al. by reference. The only quantification in any of these disclosures is the optional inclusion of 25 to 75 wt.% of red lead in delay compositions otherwise constituted of silicon and barium sulfate. None of them suggests any reason for including levels of red lead below 25 wt.%; thus, within the scope of their teaching, any optimization of red lead content would occur only between 25 and 75 wt.%.

What this means is that, so far as appears from the present record, and so far as appellant is aware, the mixtures of silicon, red lead oxide and barium sulfate "known in the art" to which Dufrane et al. refers are mixtures having a red lead content between 25 and 75 wt.%, and the value of red lead content in this prior art would have been recognized as a result effective variable (if at all) only within this range. It would not have been routine or obvious to use a level of red lead content entirely outside and below this range, i.e., appellant's claimed level of 3 - 15 wt.%.

Third, and most important, appellant's use of red lead in a range of 3 to 15 wt.% (in a mixture with silicon and barium sulfate) achieves important and unexpected beneficial new results affording particular advantages for use with rigid metal confinement elements, an environment of use which (with its special problems) is entirely outside the contemplation of Dufrane at al.

In a previous Office Action, the Examiner noted that the present claims are not limited to a rigid metal confinement element. Nevertheless, it is pertinent to the patentability of the claimed delay composition that the properties achieved by the presence of about 3 to 15 wt.% of red lead afford special advantages for use with a rigid metal element. Since Dufrane et al. has no concern for rigid metal elements or their associated problems, it would not have been obvious from Dufrane et al. to adjust the level of red lead content in such a way as to optimize composition properties to overcome those problems, even if Dufrane et al. broadly taught or suggested (which it does not) that red lead content is a result-effective variable for other purposes. The improvement achieved by appellant in properties specific for use with rigid metal elements would manifestly not be expected from the disclosure of Dufrane et al. An unexpected result may impart patentable weight even to a selection of values of a recognized result-effective variable (*In re Antonie, supra*, 195 U.S.P.Q. at 8).

These unexpected results are shown in Table 1 and Figs. 9 and 10 of the present application, and discussed in the section headed "Summary of Invention" above. To recapitulate that discussion, Table 1 on page 12 of the present application shows that the timing delay increases when red lead is first introduced (3% compared to 0%), so it is not acting just as an accelerant to the combustion process as might be expected. Indeed, Table 1 shows that at contents up to 9%, red lead increases the average time of delay compared to a composition having zero percent red lead. Again, red lead is not acting as an accelerant. On the other hand, a considerable improvement in reliability (Coefficient of Variation) is achieved compared to the composition having no red lead.

Figs. 9 and 10 of the application clearly show that, over the range of 3 to 15% for red lead, the delay timings and the Coefficient of Variation (CV) remain quite stable (reach a plateau), which are essential considerations for the present invention. If these values varied significantly within the range, it would make the compositions very sensitive to content variations, and it would be necessary to measure the proportions of the ingredients very precisely, possibly more precisely than is compatible with mass-production. Figs. 9 and 10 also show that the delay timing and CV are optimal for the invention.

In summary, as stated in the present specification, at p. 8, lines 24-31, referring to the barium sulfate/silicon/red lead delay compositions of appellant's claimed invention,

> "If the percentage of red lead is increased much beyond about 15 % by weight, the burn rate becomes excessively fast for long delays, whereas if the percentage is less than 3 %, there are no benefits in terms of robustness of combustion and reliability. Although the amount of red lead is much less than previously employed in compositions of this kind (e.g. as disclosed in U.S. Patent 4,419,154), it has been surprisingly found that the amount is sufficient to impart suitable robustness and reliability of combustion to the composition when used in rigid metal confinement elements, without increasing the burn rate unacceptably for long delay uses."

Clearly this is an unexpected new result, attributable to the critical range of about 3 to 15 wt.% of red lead in the claimed composition, and entitled to weight in determining the patentability of the claims on appeal. The prior art, as noted, insofar as it quantifies red lead content at all, teaches only amounts of 25 wt.% or more (in Davitt et al., cited supra), whereas appellant's Fig. 9 supports the

above-quoted statement that above about 15 wt.% of red lead "the burn rate becomes excessively fast for long delays." The Dufrane et al. patent fails to disclose that red lead content is a result-effective variable for any purpose, and does not mention the problem presented by rigid metal confinement elements; hence, it could not motivate an artisan of ordinary skill to "optimize" red lead content in such a way as to overcome that problem.

Of course, the rejection is based on a combination of references, but Taylor et al., cited only for the use of a binder (and containing no disclosure of a mixture of silicon, barium sulfate and red lead), is not even asserted to add anything to Dufrane et al. with respect to the presence or range of red lead content. Thus, no combination of Taylor et al. with Dufrane et al. could make obvious a composition as claimed containing about 3 to 15 wt.% red lead, whether or not a carboxymethyl cellulose binder is present.

As a final point, attention may be directed to Beck et al. (cited supra). Though the Examiner has not relied on Beck at al., it is of record in the prosecution and is part of the "prior art" to which the nonobvious standard of §103(a) is addressed, and with which the artisan of ordinary skill is presumed to be familiar. Beck et al. is the only reference of record that deals with problems caused by rigid metal elements for containing delay compositions. Beck et al. also incorporates by reference the British counterpart of Davitt et al., which is the only known prior art containing any quantitative disclosure of silicon - barium sulfate - red lead mixtures for use as delay compositions.

Beck et al., at col. 3, lines 45-52, describes the inclusion of red lead in a silicon-barium sulfate delay composition for containment in a rigid metal element. There is no anticipation of the present invention because Beck et al. does not quantify the amount of red lead. Beck et al. states that red lead "would cause a faster rate of burning" but ascribes no other beneficial result and indicates that red lead may impair the effect of the flux which Beck et al. uses to solve the rigid metal element problems. There is certainly no suggestion that red lead in any amount would overcome those specific problems; indeed, Beck et al. positively points away from the use of red lead at all.

This being so, a person of ordinary skill in the art, having Beck et al. as well as Dufrane et al. and Taylor et al. in mind, would not be led to try to optimize the properties of a silicon - barium sulfate - red lead delay composition, for containment in a rigid metal element, by varying the red lead content of the Dufrane et al. mixture.

Appellant therefore submits that the recital of a red lead content of about 3 to 15 % by weight, in each of independent claims 1 and 11, in the defined combination with the other composition limitations of those claims, presents a clear and patentable distinction over Dufrane et al. and Taylor et al., considered together, and however combined.

SEPARATE PATENTABILITY OF CLAIMS 5 – 9 AND 11

Each of claims 5 (on which claims 6-9 are dependent) and 11 recites the presence of a binder in combination with the mixed particles of silicon, barium sulfate and red lead in a delay composition wherein the red lead content is about 3 to 15% by weight of the composition. The specification explains that the binder serves to agglomerate collections of individual particles into larger free-flowing granules which have the ability to flow freely and which tend to include a range of particle sizes, facilitating introduction of the composition to a narrow rigid confinement element, compaction and extended periods of storage or use (p. 9, line 19 - p. 10, line 8).

The final Office Action acknowledges that Dufrane et al. does not disclose "The binder of sodium carboxymethyl cellulose." In fact, Dufrane et al. does not mention or suggest the use of any binder at all. Nevertheless, the Action asserts that it would have been obvious "to use the [carboxymethyl cellulose] binder as taught by Taylor [et al.] with the delay composition of Dufrane [et al.] since Taylor [et al.] suggests that the binder is useful in delay compositions."

Taylor et al., however, describes the use of carboxymethyl cellulose only with "primary explosives" corresponding to the primer charge or initiating charge 15 of lead azide in appellant's specification, i.e., the charge that is ignited by the claimed delay composition. Although Taylor et al. states (col. 1, lines 18-19) that "Primary explosives are used for initiating or delay purposes," it is clear that the only "primary explosives" contemplated by the patent are very different in composition from the mixture of barium sulfate, silicon and red lead to which appellant's claims are limited.

A characteristic of the "primary explosive" compositions with which Taylor et al. is exclusively concerned is that they are formed by precipitation of crystals from solution, wherein "The addition of carboxymethyl cellulose gives very effective control of the rate of burning by regulating the crystal growth as well as the inertness of the explosive" (col. 3, lines 63-66). Consequently,

insofar as Taylor et al. can be said to indicate a relation between the use of carboxymethyl cellulose and burning rate, that relation exists only as to compositions in which the addition of carboxymethyl cellulose can regulate crystal growth of the primary explosive. Appellant's claimed delay composition of barium sulfate, silicon and red lead is not produced by precipitation of crystals formed in solution; hence the teaching of Taylor et al. could not indicate, to a person of ordinary skill in the art, how carboxymethyl cellulose would affect such combinations.

It follows that Taylor et al. would not suggest or make obvious the asserted combination of carboxymethyl cellulose with a delay composition comprising barium sulfate, silicon and red lead. Reinforcing this conclusion is the statement, in Taylor et al. (col. 1, lines 28-34) that "The primary explosive art . . . advances slowly as no improvement can be theoretically predicted and even techniques used in the manufacture of other explosives cannot be applied . . . ." By a parity of reasoning, such a narrow limit of predictability would negative obviousness in the application of a teaching in the primary explosive art to the very different delay compositions of appellant's claims.

Taylor et al. mentions only carboxymethyl cellulose whereas appellant's claims 5 and 9 more broadly recite binders. But if Taylor et al. fails to make obvious the use of carboxymethyl cellulose in the specific compositions of appellant's claims, surely it does not make obvious such use of any other binder in the latter compositions.

Therefore it is submitted that the recitals of a binder in claims 5 and 11 (i.e., in combination with a composition comprising barium sulfate, silicon and red lead) distinguish these claims, and claims 6 - 9 dependent on 5, patentably over Dufrane et al. and Taylor et al.

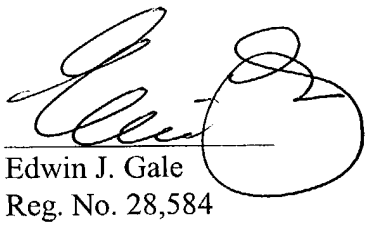
(9) Appendix

A copy of the claims on appeal is set forth in an Appendix immediately following the conclusion and signature page, and is incorporated herein by this reference.

Conclusion

For the foregoing reasons, it is respectfully requested that the decision of the Examiner rejecting claims 1 - 11 be reversed, and that the claims be allowed.

Respectfully,



Edwin J. Gale
Reg. No. 28,584
Agent for Appellant
Tel. (613) 237-6900

KIRBY EADES GALE BAKER
Box 3432, Stn. D
Ottawa, Ontario
Canada K1P 6N9
June 16, 2004

(9) Appendix

1. A delay composition comprising mixed particles of silicon, barium sulfate and red lead, the red lead being present in an amount of about 3 to 15% by weight of the composition.

2. The composition of claim 1 wherein the red lead is present in an amount of about 6 to 12% by weight of the composition.

3. The composition of claim 1 wherein the red lead is present in a amount of about 9 to 12% by weight of the composition.

4. The composition of claim 1 wherein the composition contains about 40 to 60% by weight of said barium sulfate and about 25 to 50% by weight of said silicon.

5. T he composition of claim 1 further containing a binder causing collections of said particles to bind together in the form of free-flowing granules.

6. The composition of claim 5 wherein said binder is selected form the group consisting of solvent-soluble polymers, silica and swelling clays.

7. The composition of claim 5 wherein said binder is a water-soluble derivative of cellulose.

8. The composition of claim 5 wherein the binder is carboxymethyl cellulose.

9. The composition of claim 8 wherein said binder is present in an amount of 0.2 to 0.6% by weight of the composition.

10. The composition of claim 1 wherein the particles of barium sulfate have a specific surface area of about 0.8 m^2/g, the particles of silicon have a specific surface area of 6 to 8 m^2/g, and the red lead has a particle size of about 1 to 3 microns.

11. A delay composition in the form of free flowing granules each consisting essentially of mixed particles of silicon, barium sulfate and red lead, together with a binder, the red lead being present in an amount of about 3 to 15% by weight of the composition.